WHAT IS CLAIMED IS:

1. A method for detecting the direction of an incoming round, comprising the steps of:

deploying an E-field sensor array having individual E-field sensors;

determining the time difference of arrival of the round adjacent each of said E-field sensors in the array; and,

computing angle of arrival from the time differences.

2. The method of Claim 1, wherein the time-difference-of-arrival determining step includes detecting the zero crossover of the signals from each of the E-field sensors to detect the time of closest approach of the round to the sensor.

3. The method of Claim 2, wherein the zero crossover is determined by a first partial derivative of dE/dT for each E-field sensor.

4. The method of Claim 1, wherein the E-field sensors are located on the corners of a rectilinear shape.

5. The method of Claim 4, wherein the rectilinear shape is a square.

6. The method of Claim 4, wherein the step of computing angle of arrival includes using an arc-tan-2 function, with selected E-field sensor pair time differences of arrival used as the arguments for the arc-tan-2 function.

7. The method of Claim 1, and further including the step of filtering the outputs of the E-field sensors to remove E-field disturbances due to the local power line fields.

8. The method of Claim 7, wherein the filtering step includes providing a plurality of bins for accumulating the output of the associated E-field sensor, with the bins dividing up the AC power line cycle and providing an average value for each bin over a number of cycles, with a predetermined variation in a bin from the average value being declared an event not due to power line-induced E-field changes.

9. The method of Claim 8, and further including the step of storing all of the E-field outputs after a declared event.

10. The method of Claim 9, wherein the angle of arrival is computed from the stored outputs associated with a declared event.

11. The method of Claim 10, wherein the time difference of arrival between pairs of E-field sensors is computed from the stored outputs.

12. The method of Claim 1, wherein separate angle of arrival computations are made for different pairs of E-field sensors.

13. The method of Claim 12 and further including determining the standard deviation for each computed angle of arrival and for declaring the passage of a round, when the computed angle of arrival is less than the standard deviation.

14. The method of Claim 13, wherein the computed angles of arrival for each pair are averaged prior to comparison with the standard deviation.

15. The method of Claim 1, wherein the direction of an incoming round is used for applications selected from the group consisting of man-carried E-field sensors, land vehicle-carried E-field sensors and aircraft-carried E-field sensors.

16. Apparatus for detecting the direction of an incoming round, comprising:

an array of individual E-field sensors, each having an output; and,

a processor coupled to each E-field sensor to determine the time of closest approach of said round to the associated sensor and to determine angle of arrival from the time difference of arrival of the round at selected pairs of E-field sensors.

17. The apparatus of Claim 16, wherein said array is a rectilinear array.

18. The apparatus of Claim 17, wherein said array is a square array.

19. The apparatus of Claim 16, wherein different pairs of sensors are used to compute angle of arrival, each resulting in an angle of arrival in different separate channels, and wherein said processor averages the results in each channel and compares the averaged results to an associated standard deviation, such that when the averaged results are within a predetermined standard deviation the presence of a round is declared as well as the direction of the trajectory of said round.

20. The apparatus of Claim 16, and further including a display of the direction of said incoming round.